Case report

Compartment syndrome after tibial plateau fracture missed due to peripheral neuropathy

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1. Introduction

Acute compartment syndrome is a serious and potentially devastating complication following fractures of the tibia. The clinical presentation and evaluation have been well documented in the literature. Early accurate diagnosis is essential for the prevention of irreversible muscle damage. An important diagnostic presentation is the presence of severe pain out of proportion despite stabilisation of the fracture. Other important clinical features include paraesthesia and pain on passive stretching of the involved muscle. Pain may be an unreliable indicator, especially when regional anaesthesia has been utilised or in the presence of altered sensation as a result of peripheral neuropathy. Early diagnosis is essential and the prognosis is dependent on the time of surgical intervention which ideally should be within four hours of the onset of muscle ischaemia.

We describe a patient who sustained a fracture of the tibial plateau, and the diagnosis of compartment syndrome was delayed due to the presence of co-existing diabetic peripheral neuropathy of her lower limbs. This clouded the assessment of pain and sensory symptoms at presentation and a delay in diagnosis occurred. This resulted in irreversible muscle death necessitating amputation surgery.

2. Case report

A 64 year old woman with a 30 year history of insulin dependent diabetes mellitus presented after a fall with a closed fracture of her tibial plateau (Schatzker VI). She did not present with any signs of neurovascular compromise on admission, and there were no features of a compartment syndrome. The patient was completely pain free and comfortable despite the severity of her injury. Her distal foot pulses were palpable, but she did have altered sensation bilaterally below the knee level. We were assured by the patient that this indeed was a chronic condition as a result of her known bilateral diabetic neuropathy affecting her lower limbs. The fracture was initially stabilised in a plaster backslab, she was admitted overnight for observation and further investigations were initiated to evaluate the fracture pattern with a CT scan on the same day (Fig. 1).

The patient was re-evaluated the following morning, 12 h after her admission, and now presented with an extremely swollen and tight calf, with absent palpable pulses and a delayed capillary refill of her toes. She had extremely hard and indurated compartments and altered sensation. Passive stretching of her toes was still not causing her any discomfort and she was at this stage still remarkably pain free. The clinical diagnosis of a compartment syndrome was then established and we performed an urgent four compartment fasciotomy and application of a bridging fixator. The anterior and lateral compartment muscles were dead with some delayed twitching of the posterior compartments. The compartments were debrided at the time and again 48 h later without any sign of recovery of the gastrosoleus muscles (Fig. 2). The patient subsequently underwent an above knee amputation which required a delayed closure. She is now mobilising in a wheelchair following the above knee amputation to the affected limb.

3. Discussion

Diabetic peripheral neuropathy is a common feature of insulin dependent diabetes mellitus. The majority of cases affect the lower limbs. Symptoms include a varying scale of altered sensation and the inability to feel pain, occasionally combined with tingling or hyperaesthesia. The diagnosis of compartment syndrome is essentially a clinical diagnosis based on the symptoms of inappropriate pain, made worse by passive stretching of the affected muscle, with or without sensory changes in the leg. Diabetic peripheral neuropathy can mask both the symptoms and signs, making the diagnosis challenging. The only objective investigation in this situation which could assist clinicians to make an appropriate early diagnosis would be compartment pressure measurements of the affected compartments. The effectiveness of the fasciotomy is based on relieving this pressure and re-establishing tissue perfusion within the four hour cut off time. It is widely accepted that continuous tissue pressure monitoring may indicate the onset of early acute compartment syndrome before the appearance of clinical symptoms and signs. A
Fasciotomy is indicated if the peak compartment pressure is within 30 mm Hg of the diastolic blood pressure.\(^1,6\) In our patient the masked symptoms and signs caused a delay in diagnosis which regrettably resulted in an above knee amputation. A high clinical index of suspicion is therefore paramount for the early accurate diagnosis of acute compartment syndrome after any tibial fracture, especially in patients who have altered sensation due to peripheral neuropathy. The early use of compartment pressure measurement remains an indispensable tool and is therefore highly recommended in patients with altered sensation or altered consciousness levels.

References